

Vault Secrets with Kubernetes

Exploring the Importance of Secret
Management Systems

Secrets

Sensitive credentials used in software systems, including:

- **API Keys & Tokens** (AWS, GitHub, Stripe)
- **Passwords** (Databases, Admin Logins)
- **Certificates** (TLS/SSL, Encryption Keys)
- **SSH Keys** (Server Access)

Traditional Ways of Managing Secrets

- Hardcoding in Source Code
- Storing Locally (Config Files, Downloads)
- Environment Variables (CI/CD, Configs)

Drawbacks

- **Hardcoding in Source Code**
 - **Exposure Risk:** Committed to Git → Leaked in repos.
 - **No Rotation:** Requires red deploys to change secrets.
- **Storing Locally (Config Files, Downloads)**
 - **Unsecured Storage:** User devices ≠ secret vaults.
 - **Prone to Theft:** Malware/breaches compromise local files.
- **Environment Variables (CI/CD, Configs)**
 - **CI/CD Log Leaks:** Accidental logging exposes secrets.
 - **No Central Control:** Manual updates per pipeline.

Secret Management Systems

Tools designed to **securely store, manage, and control access** to secrets. E.g. **Vault**



Benefits

- **Centralized Management**
 - No more scattered secrets—manage all in one place.
- **Dynamic Secrets & Rotation**
 - Short-lived credentials (e.g., auto-expiring DB passwords).
- **Audit Logs & Compliance**
 - Track who accessed what (SOC 2, HIPAA-ready).
- **DevOps Integration**
 - Works with Kubernetes, CI/CD, cloud platforms.

01

API Fetcher



Client

Communication



Server

Inject API



Vault

02

Token-Based APIs



Client

Send Token with Request



Server

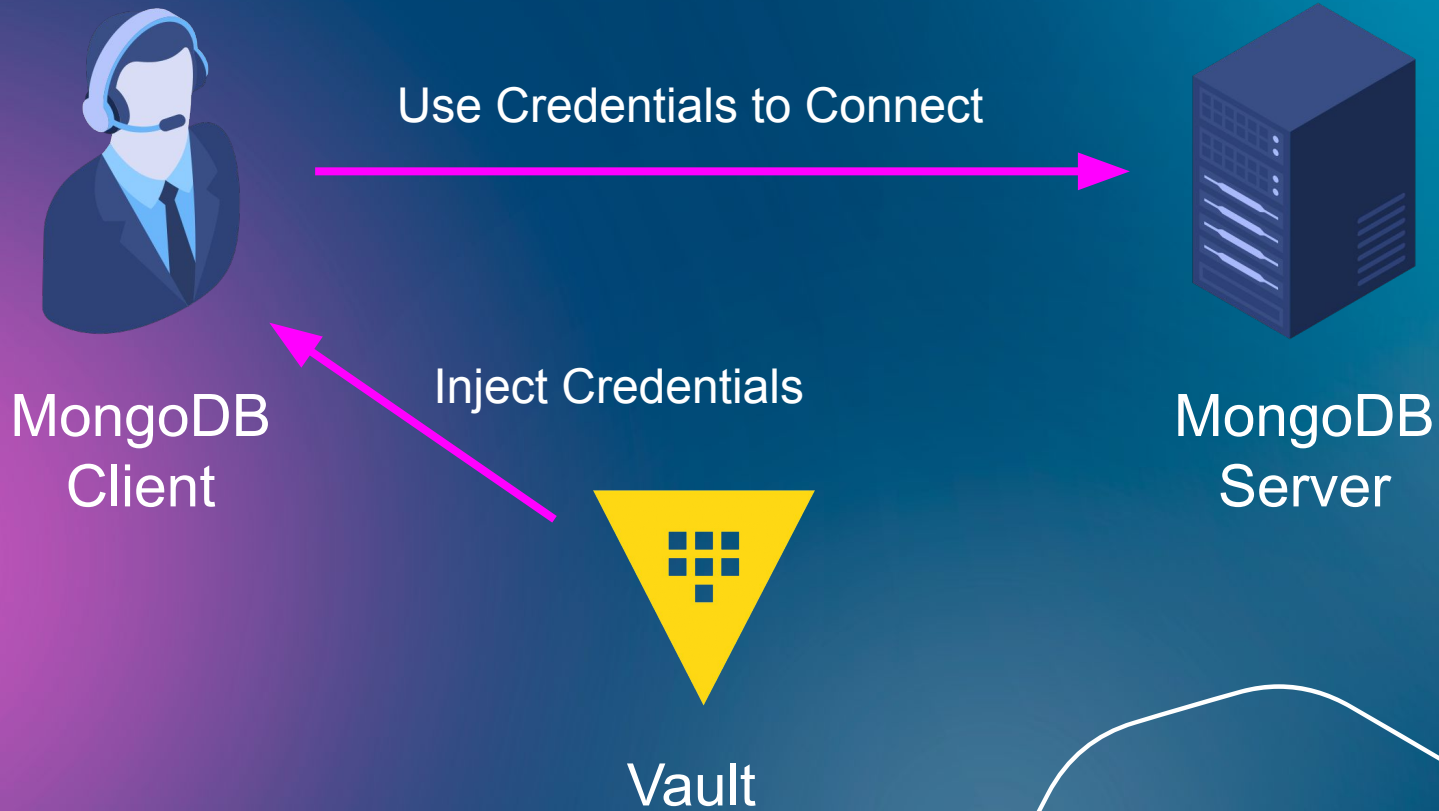
Inject Token



Vault

03

Database Connections





04

Login Authentication



Client

Use Credentials to Login



Server

Inject Credentials



Vault

The background features a gradient from dark blue at the top to a lighter blue and purple at the bottom. White, hand-drawn style line art is scattered across the image, including a large shape at the top, a vertical line with a dot on the right, and a shape on the left.

Thank you!

Do you have any questions?